

## Ode to E Pluribus Unum for Sunday April 30 2023

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### Auroral Storm over Lapland



*Image Credit & Copyright: Juan Carlos Casado (Starry Earth, TWAN)*

On some nights the sky is the best show in town. On this night, auroras ruled the sky, and the geomagnetic storm that created this colorful sky show originated from an increasingly active Sun.

Surprisingly, since the approaching solar CME the day before had missed the Earth, it was not expected that this storm would create auroras.

In the foreground, two happily surprised aurora hunters contemplate the amazing and rapidly changing sky. Regardless of forecasts, though, auroras were reported in the night skies of Earth not only in the far north, but as far south as New Mexico, USA.

As captured in a wide-angle image above Saariselkä in northern Finnish Lapland, a bright aurora was visible with an unusually high degree of detail, range of colors, and breadth across the sky. The vivid yellow, green, red and purple auroral colors are caused by oxygen and nitrogen atoms high in Earth's atmosphere reacting to incoming electrons.

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## A History of Astronomy Through 19 Objects



*Photo credit: Wikimedia, Frank Vincentz*

Humans have depicted constellations for tens of thousands of years. The above example, a nearly 4,000-year-old artifact known as the Nebra disc, was discovered in Germany and depicts the sun, moon, and stars.

<http://bit.ly/3lzufle>

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## Potentially Deadly 'Superbug' Fungus Spreading Faster in the US

A new study shows that the anti-drug resistance and number of cases of the infectious fungus *Candida auris* increased between 2019 and 2021.



*An artist's interpretation of what the fungus Candida auris might look like.*  
(Image credit: Shutterstock)

The fungus *Candida auris*, which causes a highly infectious and potentially deadly infection, is spreading faster in U.S. health care facilities and likely becoming more resistant to treatments, a new study shows.

*C. auris* is a fungal species of yeast that can infect humans and spread in the blood to major organs. The infection occurs most often in healthcare settings and long-term care facilities and is rare in healthy individuals. But for people who are immune compromised or receive regular invasive treatments for other illnesses, it can often be fatal.

The first *C. auris* infection was documented in Japan in 2009 and the fungus has since been found in many other countries, including the U.S., which had its first confirmed case in 2016. The disease made headlines back in 2019 when the number of cases began to sharply climb worldwide, and it still "presents a serious global health threat" today, according to the Centers for Disease Control and Prevention (CDC)(opens in new tab).

In the new study, published March 21 in the journal *Annals of Internal Medicine*(opens in new tab), researchers conducted a new assessment of *C. auris* cases recorded in the U.S. between 2019 and 2021. In total, 10,683 cases were recorded during this period: 3,270 of the cases were clinical infections, meaning the patient showed symptoms before being tested, and 7,413 cases were screening colonizations, meaning that people carried the fungus but showed no symptoms before being tested during routine screening. People carrying the fungus can still spread the pathogen, and they may develop symptoms of illness later on.

The number of clinical infections increased year on year during the study period. In 2019 there was a 44% increase compared with 2018; in 2020 there was a 59% spike compared with 2019; and in 2021 there was a 95% surge compared with 2020. (The study did not include data on the number of fatalities among clinical infections.)

This shows that the rate of transmission is likely increasing, study lead author Dr. Meghan Lyman([opens in new tab](#)), a medical officer at the CDC, told Live Science in an email. "The number of cases has continued to increase since 2021," she added.

The number of screening colonizations also increased significantly during the study period. But this is partially due to an increase in the number of screening tests. In 2019, there were 19,756 tests conducted nationwide, but in 2021, there were more than 40,000 tests. This suggests that the number of colonizations could be underreported due to a lack of screening tests, which could be helping the disease to spread, Lyman said.

The number of states that have recorded *C. auris* cases has also increased, from 10 states in 2018 before the study began to 27 states in 2021.

Another key finding of the new study is that *C. auris* is becoming increasingly resistant to treatments.

"There are only three main classes of antifungal medications used to treat *Candida* infections: azoles, polyenes and echinocandins," Lyman said. A majority of *C. auris* cases are resistant to azoles and a high percentage are also resistant to polyenes. But the number of cases of echinocandin-resistant *C. auris* has remained very low and, as a result, echinocandins have become the preferred treatment option for *C. auris*, Lyman said.

However, the number of echinocandin-resistant cases has increased in recent years. Six cases were reported between 2016 and 2019, another six cases were reported in 2020, and 19 were reported in 2021, which suggests the fungus is slowly becoming more resistant to this treatment. But new antifungals are in the early stages of being developed to help treat future infections, Lyman said.

Since *C. auris* is mainly transmitted in hospitals and other healthcare settings, researchers suspect that the effects of the COVID-19 pandemic may have played a role in the fungus' spread.

"Gaps in case detection and infection control existed before the COVID-19 pandemic, but pandemic-related strain on the health care and public health systems likely contributed to [increased] transmission," Lyman said.

However, for healthy people who are not regularly exposed to a healthcare setting, the risk of being infected or colonized by *C. auris* remains "low," Lyman said. But increased screening and better transmission control in healthcare settings are needed to keep the fungus under control, she added.

*By Harry Baker for LiveScience*

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## Hormonal Birth Control Slightly Increases Breast Cancer Risk Regardless of Type

Hormonal contraceptives slightly raise users' risk of breast cancer, regardless of whether they're combination or progestogen-only.



*A new study suggests that all types of hormonal birth control slightly raise user's risk of breast cancer.*

*(Image credit: Cris Cantón via Getty Images)*

Most, if not all, forms of hormonal birth control, from pills to implants to intrauterine devices (IUDs), increase the risk of developing breast cancer, a new study suggests.

It was known that combination birth control, which contains both progestogen and estrogen, comes with a slight increase in breast cancer risk. In the past decade, though, forms of birth control containing only progestogen have become more popular.

In a study published Tuesday (March 21) in the journal *PLOS Medicine* (opens in new tab), researchers show that taking progestogen-only birth control comes with a 20% to 30% increase in breast cancer risk, which is similar to its combination counterpart. The baseline risk of developing breast cancer is low, especially among young people, so this represents a relatively small increase in overall risk.

The new data can help people make more informed decisions about whether to take hormonal birth control, considering both its risks and benefits, which include protecting against other forms of cancer, including ovarian cancers.

"We know that current use of combined oral contraceptives is associated with a small, transient increase in breast cancer risk that declines after stopping use," Kirsten Pirie (opens in new tab), a statistical programmer with the Nuffield Department of Population Health's Cancer Epidemiology Unit at the University of Oxford and coauthor of the study, wrote in an email to Live Science. "However, less is known about progestogen-only contraceptive use."

The researchers looked at data from the Clinical Practice Research Datalink, a database made up of healthcare information from the U.K. National Health Service. They

examined a group of about 9,500 women under age 50 who were diagnosed with breast cancer between 1996 and 2017, as well as 18,000 women under age 50 who were not diagnosed with the disease.

About 44% of those with breast cancer and 39% of the healthy controls had a current or recent hormonal contraceptive prescription, and about half of the birth control was progestogen-only. The risk of being diagnosed with breast cancer increased about 25% for women on birth control, regardless of whether it was combined or progestogen-only. This risk was consistent across four types of birth control — pills, implants, injections and IUDs — and didn't change due to factors like age, body mass index or number of births.

The researchers also analyzed previous studies that examined breast cancer risk among women taking different types of progestogen-only birth control. That data was consistent with the new data they collected, as well as data from studies on breast cancer risk in people taking combination hormonal birth control. (These previous studies didn't all control for the same factors that might influence their results, such as age at first birth, but in general these factors "appeared to have little impact on the results," the authors wrote.)

The researchers estimated the 15-year "excess risk" of being diagnosed with breast cancer if you've used either combination or progestogen-only birth control — this estimate covers five years of contraceptive use followed by 10 years off contraceptives. It amounted to about 8 of 100,000 users aged 16 to 20, 61 of 100,000 users aged 25 to 29, and 265 of 100,000 users aged 35 to 39, who have a higher baseline risk of breast cancer than younger people.

Given that combination hormonal birth control has long been used despite this same association, the findings will likely not have a major impact on whether people choose to take progestogen-only birth control, the authors said at a press conference on March 20.

They also noted that hormonal birth control is associated with protection against endometrial and ovarian cancers, which unlike the increased breast cancer risk, doesn't go away after birth control is stopped. (This is a well-established benefit of combination contraceptives, but the link is less clear for progestogen-only options(opens in new tab).)

"That protection against endometrial cancer and ovarian cancer actually persists into middle age," Gillian Reeves(opens in new tab), Director of the Cancer Epidemiology Unit at the University of Oxford and coauthor of the study, said during the press conference.

The study included a small number of people who had copper IUDs, which do not contain hormones, but the researchers said they didn't have enough data to determine if this form of birth control is associated with breast cancer risk or not.

*By Rebecca Sohn for LiveScience*

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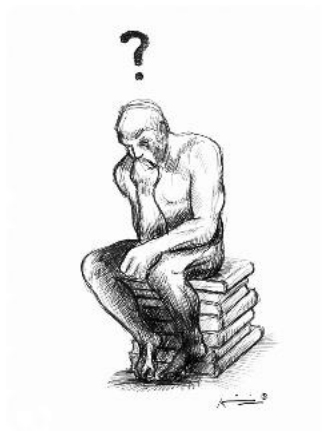
## **NPR Asked to See Your Pet Artwork — Here's the Result**



<http://bit.ly/3nLwliN>

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## **Some Questions from an Old Squadron Buddy**



Perhaps you can answer some of Dick Lammerding's questions.

Only in America ... do drugstores make the sick walk all the way to the back of the store to get their prescriptions while healthy people can buy cigarettes at the front.

Only in America ... do people order double cheeseburgers, large fries, and a diet coke.

Only in America ... do banks leave vault doors open and then chain the pens to the counters.

Only in America ... do we leave cars worth thousands of dollars in the driveway and put our useless .  
junk in the garage.

Only in America ... do we buy hot dogs in packages of ten and buns in packages of eight.

Only in America ... do they have drive-up ATM machines with Braille lettering.

**EVER WONDER .... Why the sun lightens our hair, but darkens our skin?**

**Why can't women put on mascara with their mouth closed?**

**Why don't you ever see the headline 'Psychic Wins Lottery'?**

**Why is 'abbreviated' such a long word?**

**Why is it that doctors call what they do 'practice'?**

**Why is lemon juice made with artificial flavor, and dish washing liquid made with real lemons?**

**Why is the man who invests all your money called a broker?**

**Why is the time of day with the slowest traffic called rush hour?**

**Why isn't there mouse-flavored cat food?**

**Why didn't Noah swat those two mosquitoes?**

***Why do they* sterilize the needle for lethal injections?**

**You know that indestructible black box that is used on airplanes? Why don't they make the entire plane out of that stuff?**



**Why don't sheep shrink when it rains?**

**Why are they called apartments when they are all stuck together?**

**I like this one!!!**

**If con is the opposite of pro... is Congress the opposite of progress?**

**If flying is so safe, why do they call the airport the terminal?**

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## **Derinkuyu: Mysterious Underground City in Turkey**



A basement renovation project led to the archaeological discovery of a lifetime: the Derinkuyu Underground City, which housed 20,000 people.

<http://bit.ly/3ZE0JIT>

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**Are Secrets to Extreme Longevity Hiding with Nuns and Jellyfish?**



Some people live to be well beyond 100. But what genes and environmental factors contribute to such extreme longevity, and what can we learn from other long-lived animals?

<http://bit.ly/3nIY7MN>

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### **Four-Legged Robotic System Plays Soccer on Various Terrains**

“DribbleBot” can maneuver a soccer ball on landscapes such as sand, gravel, mud, and snow, using reinforcement learning to adapt to varying ball dynamics.



<http://bit.ly/3Kx38RC>

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### **March’s Best Science Images**

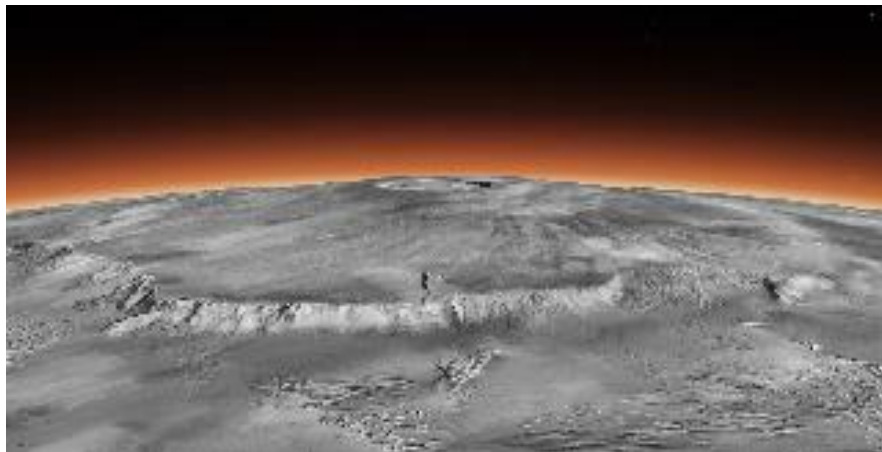
The month's sharpest science shots, selected by Nature's photo team.



<http://bit.ly/3zv75Ql>

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## Scientists Unveil a 5.7 Terapixel Global Image of Mars



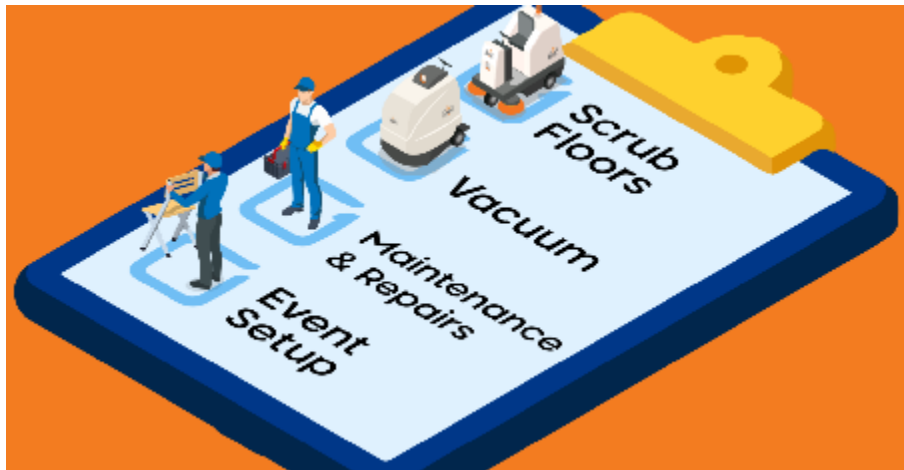
*Credit: NASA/JPL-Caltech/MSSS*

A planet-spanning online image of Mars created at a scale of 5 meters per pixel was unveiled today. The image is freely available to the public and can be accessed online through Caltech's Bruce Murray Laboratory for Planetary Visualization. It will also be delivered to the NASA Planetary Data System for posting.

<http://bit.ly/3zMyL3m>

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## How Robots Solve School Staff Shortages



Schools are faced with a rising imperative to create safe, clean and healthy learning environments for students and faculty throughout the school year. The growing expectations surrounding facility cleanliness have left many schools with short-staffed custodial teams which, in turn, impacts job satisfaction and day-to-day school operations. When schools go uncleaned, student and faculty sick-day absences increase, resulting in inconsistent teaching for students and less support for positive academic outcomes.

<https://braincorp.com/blog/how-robots-solve-school-staff-shortages/>

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## He Felt the Slither of a Venomous Snake in the Cockpit



— then turned the plane around

It was a Cape Cobra (*Naja nivea*), with a head that is hardly set off from the body, reaches a length of up to 5.25 feet and has big eyes with a round pupil. Its bite can kill a person in as little as one hour.

"I was more afraid of what the snake might do. Luckily it didn't strike anyone, otherwise that would have changed or complicated the whole situation," he says.

The incident has drawn comparisons to the cult 2006 film *Snakes on a Plane*, in which an FBI agent played by Samuel L. Jackson lets loose an expletive-laden tirade when he discovers the plane he's on is full of venomous snakes.

Erasmus says he'd seen the movie some time ago and the tirade was playing out inside his own head. "That's how I felt at some point," he says, laughing.

Erasmus has been praised by South African civil aviation commissioner Poppy Khoza, who called him "a hero" and said he "saved all lives on board."

Since landing, however, the snake has not been found. It seems to have boarded (and disembarked, everyone hopes) on its own.

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## 10 Biggest Megaprojects in The World



Take a look at the 10 biggest megaprojects in the world. From bridges to train networks, these enormous engineering feats are sure to impress and amaze.

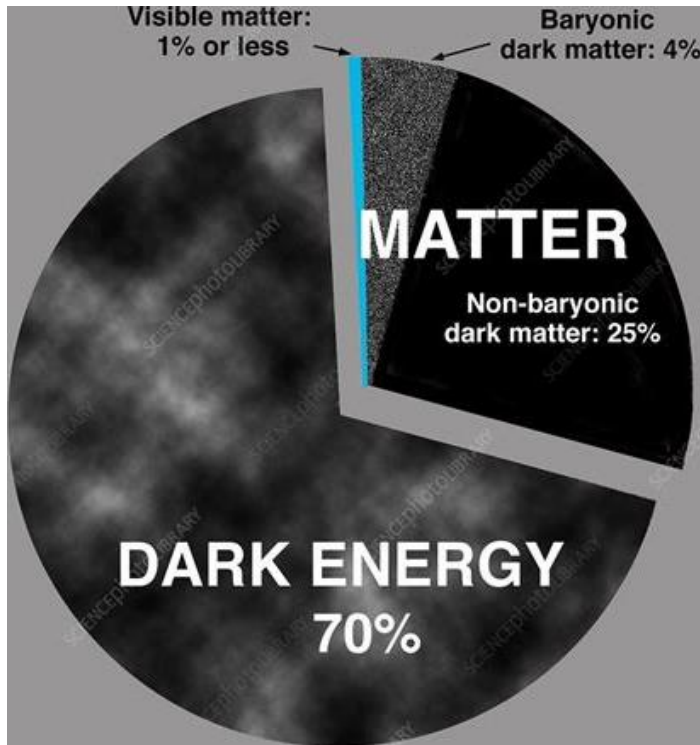
<http://bit.ly/41iCwcD>

*Not surprisingly several have proved to be monumental busts. More to follow?*

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## What are Dark Matter and Dark Energy?

Well, if we knew exactly, we would have a Nobel prize – we know that they exist though. So, what do we know about those strange things?

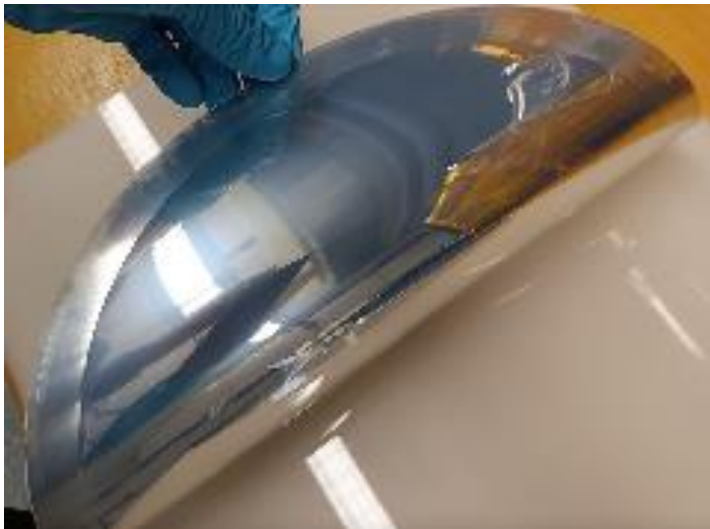


[https://youtu.be/QAa2O\\_8wBUQ](https://youtu.be/QAa2O_8wBUQ)

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## Rollable 'Membrane Mirrors' for More Powerful Space Telescopes?

'It could make lightweight mirrors that are 15 or 20 meters in diameter a reality.'



*Membrane mirrors made using a new technique are flexible enough to be rolled up. This could be helpful for storing the mirrors inside of a launch vehicle.*

*(Image credit: Sebastian Rabien, Max Planck Institute for Extraterrestrial Physics)*

Using his new method, Rabien built a mirror 0.9 feet (30 centimeters) wide. He created what is called a membrane mirror by placing an evaporated material, the identity of which is not disclosed in the statement, into a vacuum chamber. Soon after, a lightweight polymer membrane, likely as thin as household plastic wrap, began to form.

<http://bit.ly/3ZZ8Sb3>

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## **Biggest Hydrogen Fuel Plane Flies for First Time**



Universal Hydrogen has successfully completed the first test flight of its hydrogen fuel plane, currently the largest of its kind. The company has been modifying the De Havilland Canada Dash 8-300 aircraft, replacing one of its engines with a MagniX electric motor, which is powered by a hydrogen fuel cell.

<https://bit.ly/3GPIwSn>

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## **New Carl Sagan Documentary in the Works**



Seth MacFarlane unites with NatGeo to celebrate the famed astronomer.

<https://bit.ly/3mxSUaw>

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## Leashed Dog Walking Risks



*Researchers found that women, and all adults age 65 and older, were more likely to sustain serious injuries, such as fractures and TBIs, as a result of walking a leashed dog.*

*Credit: Getty Images*

Traumatic brain injury was the second-most common injury related to leashed dog walking among adults treated in U.S. emergency rooms from 2001 to 2020

<https://bit.ly/3NldMfO>



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## **Roses of the Deep**

A pristine coral reef off Tahiti has recently been found at unexpected depths. The condition of, and extensive area covered by, the rose-shaped coral reef make it a highly valuable discovery.



<https://oceanographicmagazine.com/features/roses-of-the-deep/>

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## **Meet 'Croczilla,' Largest Croc in the Florida Everglades**



*Photo: Kymberly Clark*

*I'm happy not to be a wildlife photojournalist.*

<https://bit.ly/3mVeYfd>

*I see him as the father of 800 super-sized cowboy boots...teeth for bling.*

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**The Raven. Edgar Allan Poe. Reading By Vincent Price**



<https://youtu.be/T7zR3IDEHrM>

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## **Great Pacific Garbage Patch Is Now Home to Dozens of Coastal Species**

Researchers observed various coastal species thriving, surviving, and reproducing on floating plastic debris, resulting in the formation of a new type of ecosystem.



*Representational image*

*RomoloTavani/iStock*

Scientists have discovered an astonishing ecosystem developing around the Great Pacific Garbage Patch, which is located between California and Hawaii.

The vast plastic debris patch is a 620,000-square-mile area of trash swirling in the Pacific Ocean. It is said to be an ecological disaster because it contains 1.8 trillion pieces of plastic.

The Smithsonian Environmental Research Center (SERC) has led this new study. They observed various coastal species thriving, surviving, and reproducing on floating plastic debris, resulting in the formation of a new type of ecosystem. These species do not belong here, and their home is thousands of miles away, according to the study. But the species appear to have adapted to life on the plastic thrash in the middle of the ocean.

"Our results demonstrate that the oceanic environment and floating plastic habitat are clearly hospitable to coastal species. Coastal species with an array of life history traits can survive, reproduce, and have complex population and community structures in the open ocean," noted the research paper.

The team found 484 marine invertebrate organisms living on the debris, representing 46 different species. Among them, 80 percent of these species belong to coastal habitats.

### **Examining 105 pieces**

The researchers examined 105 pieces of debris collected between November 2018 and January 2019. Reproduction record of various types of coastal invertebrates in plastic habitats was also found. The plastic debris included fishing nets, ropes, and bottles, as per CNN.

Tiny crabs, sea anemones, white bryozoa, hydroids, shrimplike amphipods, Japanese oysters, and mussels were among the species found surviving in the plastic patch.

“Our results suggest that the historical lack of available substrate limited the colonization of the open ocean by coastal species, rather than physiological or ecological constraints as previously assumed. It appears that coastal species persist now in the open ocean as a substantial component of a neopelagic community sustained by the vast and expanding sea of plastic debris,” stated the research paper.

The study has been published in [Nature Ecology & Evolution](#).

**Study abstract:**

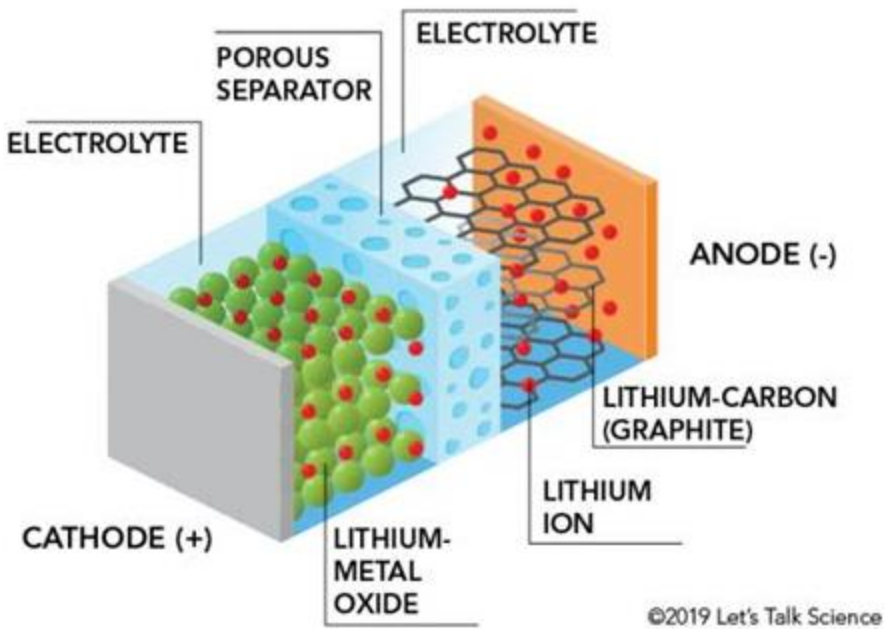
We show that the high seas are colonized by a diverse array of coastal species, which survive and reproduce in the open ocean, contributing strongly to its floating community composition. Analysis of rafting plastic debris in the eastern North Pacific Subtropical Gyre revealed 37 coastal invertebrate taxa, largely of Western Pacific origin, exceeding pelagic taxa richness by threefold. Coastal taxa, including diverse taxonomic groups and life history traits, occurred on 70.5% of debris items. Most coastal taxa possessed either direct development or asexual reproduction, possibly facilitating long-term persistence on rafts. Our results suggest that the historical lack of available substrate limited the colonization of the open ocean by coastal species, rather than physiological or ecological constraints as previously assumed. It appears that coastal species persist now in the open ocean as a substantial component of a neopelagic community sustained by the vast and expanding sea of plastic debris.

*Mrigakshi Dixit for Science*

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**Six Major Types of Lithium-ion Batteries: A Visual Comparison**

## PARTS OF A LITHIUM-ION BATTERY



<https://elements.visualcapitalist.com/the-six-major-types-of-lithium-ion-batteries/>

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### The Joy of Why

The mathematician and author Steven Strogatz interviews leading researchers about the great scientific and mathematical questions of our time.



<https://bit.ly/3Ng5p5w>

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### New System for Turning Seawater into Hydrogen Fuel

The SLAC-Stanford team pulled hydrogen directly from ocean waters. Their work could help efforts to generate low-carbon fuel for electric grids, cars, boats and other infrastructure.



<https://bit.ly/3AIZSSU>

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## Augustin Hadelich



Augustin Hadelich came to town this past Monday playing Ysaye's Sonata #2, Obsession Bach's Partitas #3 and #2 and Colerage-Taylor Perkinson's Blue/s Forms at Santa Barbara's Lobero Theater. I have no words to do justice to the performances, each of which provided proof positive that Hadelich ranks with the very best violinist in the world today...perhaps at the very top of such a list.

He brought onstage the violin '*Leduc, ex-Szeryng*' by Guiseepe Guarneri de Gesu of 1744.

Here was his program for the evening.

Bach Partita #3 <https://youtu.be/mqOOQunYMo4>

Ysaye Sonata #2, Obsession <https://youtu.be/sPQ5E4o9Ewk?t=19>

Perkinson: Blue/s Form <https://youtu.be/lHulU-BraS4>

Bach Partita #2

Allamande [https://youtu.be/GRhNouym\\_to](https://youtu.be/GRhNouym_to)

Courante <https://youtu.be/pLIGMhq8UOY>

Sarabande <https://youtu.be/DSkASbXy67g>

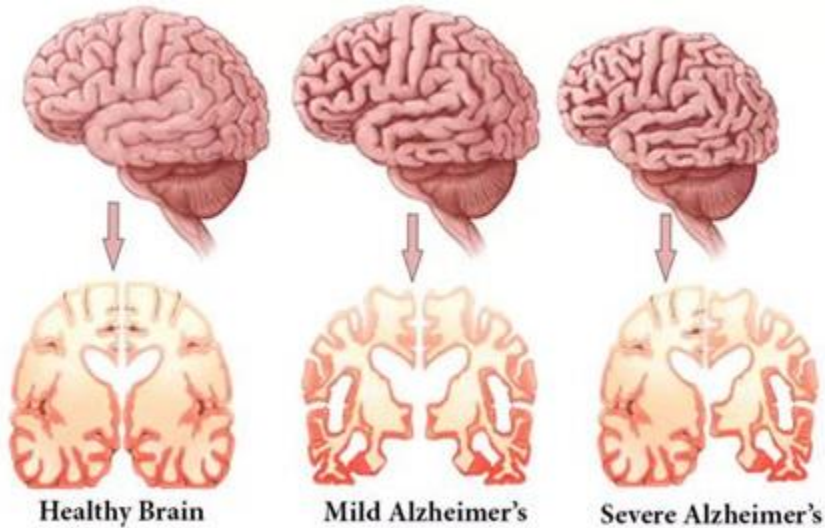
**Chaconne** <https://youtu.be/SrjIMBpwuK4?t=12>

I suggest you make time to listen to each of these pieces, but if you do nothing else with this week's Ode, please turn your full attention to Bach's Partita #2 for unaccompanied violin with its magnificent Chaconne...in my opinion the finest piece ever penned for solo violin.

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## **Conquering Alzheimer's: A Look at the Therapies of the Future**

Researchers are looking to drug combinations, vaccines, and gene therapy as they forge the next generation of treatments for the condition.

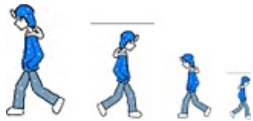


<https://www.nature.com/articles/d41586-023-00954-w>

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## **My Walking Thoughts**



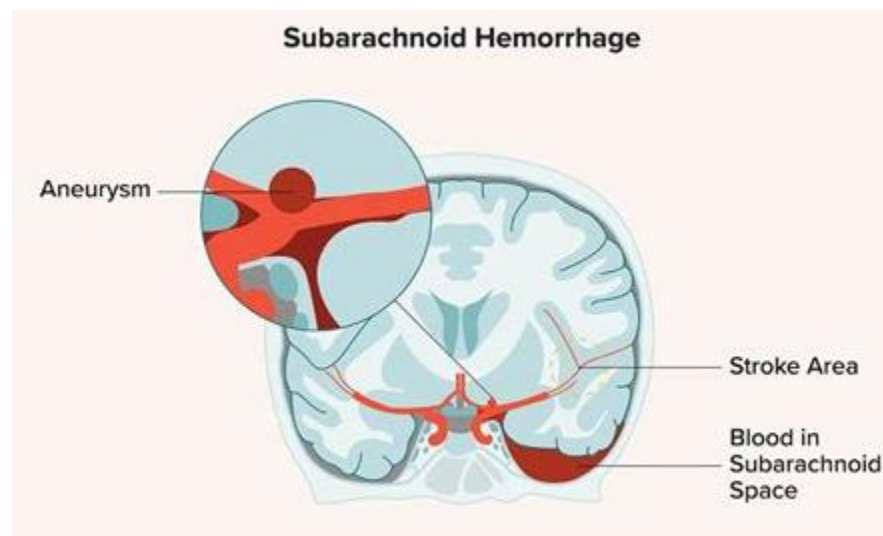


**For Sunday April 30 2023**

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### **Comment on Last Week's Headache Article from an Expert**

The article about headache is out of date. 20 years ago, yes, that was the explanation. But whenever arteries dilate they cause a great deal of pain. And we have ever so many arteries going to the head. Almost certainly arterial spasm or dilatation is the cause of migraines. Also, though the brain itself does not have pain sensors, there are plenty of arteries inside the skull that do.



When patients suffer a subarachnoid hemorrhage, say from a ruptured aneurysm, they describe it as the "worst headache of my entire life." The exquisite pain is from fresh blood being around the arteries at the base of the brain.

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**According to CDC, Cigarette Smoking in the US Declined Last Year**



The number of US adults who smoke cigarettes dropped to an all-time low last year, according to new data released this week from the US Centers for Disease Control and Prevention (CDC) whose 2022 survey of more than 27,000 adults showed a 1.5% decrease (11%, down from 12.5% in 2021 and in 2020).

You probably can attribute the drop to such factors as increased costs, smoking bans in public spaces, and increased health awareness on the part of the public.

According to CDC:

*"Smoking leads to disease and disability and harms nearly every organ of the body.*

*More than 16 million Americans are living with a disease caused by smoking. For every person who dies because of smoking, at least 30 people live with a serious smoking-related illness. Smoking causes cancer, heart disease, stroke, lung diseases, diabetes, and chronic obstructive pulmonary disease (COPD), which includes emphysema and chronic bronchitis. Smoking also increases risk for tuberculosis, certain eye diseases, and problems of the immune system, including rheumatoid arthritis.*

*Secondhand smoke exposure contributes to approximately 41,000 deaths among nonsmoking adults and 400 deaths in infants each year. Secondhand smoke causes stroke, lung cancer, and coronary heart disease in adults. Children who are exposed to secondhand smoke are at increased risk for sudden infant death syndrome, acute respiratory infections, middle ear disease, more severe asthma, respiratory symptoms, and slowed lung growth."*

**That is just part of the news from CDC.**

US adults who say they used e-cigarettes in 2022 rose 1.5% (to 6% from 4.5% in 2021). E-cigarettes, or electronic cigarettes, are battery powered devices that do not contain tobacco.

Here's a more detailed look at the [vaping world](#).

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## **Do you care...and should you?**

A large percentage of men my age were smokers up until the early 1970s when President Nixon signed into law a ban on cigarette ads on TV and radio. The process continued in predominantly masculine venues (motoracing events for instance) and by 1990 I remember postulating that by 2000, smoking would have disappeared from the mainstream.

Well I was wrong, wasn't I?

As a good libertarian I believe that consenting adults should be allowed to do whatever they wish so long as their actions "ends short of their neighbor's nose." But there's the rub since much of smoking's medical burden is borne by the public at large. How much? Your guess may be better than mine, but it is far from trivial.

But even that doesn't tell the real story.

We all know people whose health has been impacted by smoking but there the concern is too late. It seems to me the real issue is how to provide effective guidance to those at the brink...children who are not in the position to make genuinely informed choices about actions whose consequences lie well beyond the limits of their experience or imagination.

*Any thoughts?*